

PATENT COOPERATION TREATY



PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

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(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference PU030164 | | FOR FURTHER ACTION | | See Form PCT/IPEA/416 |
| International application No. PCT/US2004/019527 | | International filing date (day/month/year) 17.06.2004 | Priority date (day/month/year) 25.06.2003 | |
| International Patent Classification (IPC) or national classification and IPC H04N7/26, H04N7/50 | | | | |
| Applicant THOMSON LICENSING S.A. et al | | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input checked="" type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | | |
| Date of submission of the demand 31.03.2005 | | Date of completion of this report 01.06.2005 | | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized Officer Schoeyer, M Telephone No. +49 89 2399-2136  | | |

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2004/019527

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-13 as originally filed

Claims, Numbers

1-37 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/US2004/019527

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-37 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-37 |
| Industrial applicability (IA) | Yes: Claims | 1-37 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)

and /or

2. Non-written disclosures (Rule 70.9)

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

- 1 The following documents are referred to in this communication:
 - D1 : BOJUN MENG ET AL: "Fast intra-prediction mode selection for 4x4 blocks in H.264" 2003 IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH, AND SIGNAL PROCESSING. PROCEEDINGS. (ICASSP). HONG KONG, APRIL 6 - 10, 2003, IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH, AND SIGNAL PROCESSING (ICASSP), NEW YORK, NY : IEEE, US, vol. VOL. 3 OF 6, 6 April 2003 (2003-04-06), pages III-389, XP002973809 ISBN: 0-7803-7663-3
 - D2 : US 2003/099292 A1 (GANDHI RAJEEV ET AL) 29 May 2003 (2003-05-29)
 - D3: JOCH A ET AL: "Performance comparison of video coding standards using lagrangian coder control" PROCEEDINGS 2002 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2002. ROCHESTER, NY, SEPT. 22 - 25, 2002, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US, vol. VOL. 2 OF 3, 22 September 2002 (2002-09-22), pages 501-504, XP010608018 ISBN: 0-7803-7622-6
 - D4: TAMBANKAR A ET AL: "An overview of H.264 / MPEG-4 part 10" 4TH EURASIP CONFERENCE FOCUSSED ON VIDEO IMAGE PROCESSING AND MULTIMEDIA COMMUNICATION, vol. 1, 2 July 2003 (2003-07-02), - 5 July 2003 (2003-07-05) pages 1-51, XP010650106 TAGREB, CROATIA
 - D5: KIM C ET AL: "Multistage mode decision for intra prediction in H.264 codec" PROCEEDINGS OF THE SPIE, SPIE, BELLINGHAM, VA, US, vol. 5308, no. 1, 2004, pages 355-363, XP002285981 ISSN: 0277-786X

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.
 - 2.1.1 Document D1, which is considered to represent the most relevant state of the

art to the subject matter of claim 1, discloses (see page 390, left-hand column , paragraph "2. Fast Intra-Prediction" ff.):

A video encoding method for selecting the mode of a current macro-block *in the intra-code mode*, the method comprises at least:

- checking first modes for a subset (see also under VIII) of macro block modes,
 - checking the macro block mode of at least one neighbouring macro block (see steps 4 and 5) and select the mode for the current macro block in response to the macro block mode of at least one checked neighbouring macro block;
- checking the cost of a subset of macro block modes (see e.g. step 6), and selecting the mode for the current macro block in response to the checked modes.

Differently than claimed in claim 1, it is not shown in D1 that motion vectors are used as input for the block-modes (thus also in the inter mode) or that the threshold is adjusted.

Document D2 is however, like the D1 concerned with the H.264 coding and shows (see page 5, paragraph 71-73) a method in which the motion vectors of a block are initially estimated using the information from neighbouring blocks. It is noted that field and frame based coding may also be considered to be block modes. The skilled person is well aware of the computational burden of finding an optimized mode and associated motion vector, and will try to reduce this burden. Document D1 shows a way to limit this burden by making use of the information of modes of neighbouring blocks, whereas in D2 the use of neighbouring motion vectors is shown. The combination of these two techniques is obvious because of their complementary functions.

The use of adjustable thresholds as such is well known in the art (see also under VIII), and without a technical teaching how the threshold is actually adjusted this feature cannot be considered to contribute to inventive step.

The skilled person will therefor readily apply the combination of the teachings of D1 and D2, which in combination with the common general knowledge of threshold leads to the full combination of features of claim 1.

Therefore claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).

It is noted that document D5 (see last paragraph of page 355) refers to the problem that due to the large number of modes in H.264 coding the computational burden is immense, and that there exists a need to limit the number of modes to be considered. In *Feng Pan, Xiao Lin, et al, "Fast Mode Decision for Intra Prediction", ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6, JVT 7th Meeting Pattaya II, Thailand, 7-14, March 2003*, to which it refers in this paragraph and which has been published before the date of priority of the current application, the mode prediction was carried out by considering the modes of the neighbouring blocks.

3 INDEPENDENT CLAIMS 13, 25, 37

Notwithstanding the clarity objections concerning independent claims 13, 25 and 37 (see under VIII), the subject matter of these claims does not involve an inventive step in the sense of Article 33(3)PCT for substantially the same reasons as set out above for claim 1.

4 DEPENDENT CLAIMS 2-12, 14-24, 26-36

Dependent claims 2-12, 14-24, 26-36 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT).

The features of the dependent claims are either disclosed by documents D1 or D2 or form part of the common general knowledge of the skilled person. This will be briefly set out for dependent claims 2-12, but will apply in an analogue manner to corresponding claims 14-24 and 26-36.

- selectively checking other modes (as in claim 2), -also in the procedure of D1 other modes are selectively checked;
- SKIP, 16x16, 8x8 and 4x4 modes (as in claim 3), - these modes form part of the H.264 standard.
- checking neighbouring blocks (as in claim 4), -see D1 (steps), D2 (motion vector selection);
- selection of intra mode based on preset criteria (as in claim 5), -common general knowledge;
- adjusting of threshold (as in claim 6), -common general knowledge;
- motion estimation process (as in claim 7), -see above for claim 1;

- motion information is used to decide if other modes need to be checked (as in claim 8), -common general knowledge;
- block modes (as in claim 9), -D1, D2 and common general knowledge of use of neighbouring information;
- mode checking for both inter and intra modes (as in claim 10), the mode checking of the intra modes is known from D1, whereas the inter mode is known from the combination of D1 and D2 (as set out above for claim 1);
- early stop (as in claims 11, 12), -see D1 (e.g. step 2);

Article 33(4) PCT

The subject-matter of claims 1-37 is industrially applicable in the field of image coding.

Re Item VI.

Certain documents:

- D4: TAMBANKAR A ET AL: "An overview of H.264 / MPEG-4 part 10" 4TH EURASIP CONFERENCE FOCUSSED ON VIDEO IMAGE PROCESSING AND MULTIMEDIA COMMUNICATION, vol. 1, 2 July 2003 (2003-07-02), - 5 July 2003 (2003-07-05) pages 1-51, XP010650106 TAGREB, CROATIA
- D5: KIM C ET AL: "Multistage mode decision for intra prediction in H.264 codec" PROCEEDINGS OF THE SPIE, SPIE, BELLINGHAM, VA, US, vol. 5308, no. 1, 2004, pages 355-363, XP002285981 ISSN: 0277-786X

Re Item VII.

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D2 are not mentioned in the description.
2. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3. In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

Re Item VIII.

Article 6 PCT

The term "mode" is very broad and may be considered to involve more than only the modes as defined by the JVT/H.264 standards.

The expression "subset" does not clearly set out the fact that the number of modes considered in the methods and by the apparatus is indeed smaller than the whole number of modes in a set. A subset of a whole set actually includes this whole set as well. Thus in particular the method as set out claim 37 also encompasses a full search of the different modes.

The technical significance of the expression "adjusting and early-stopping threshold" is not understood, since it is unclear under what conditions the threshold is changed and what this change results in.

The videodisc as claimed in claim 25 will contain data which can not be distinguished from data which has been created using e.g. a full-search algorithm. Thus it is unclear what scope, the subject-matter of claims 25-36 should actually encompass.

It is not understood how the subject-matter of claims 6 as dependent on claim 1, differs from that of claim 1.

It is not understood how the subject-matter of claims 7 as dependent on claim 1, differs from that of claim 1.